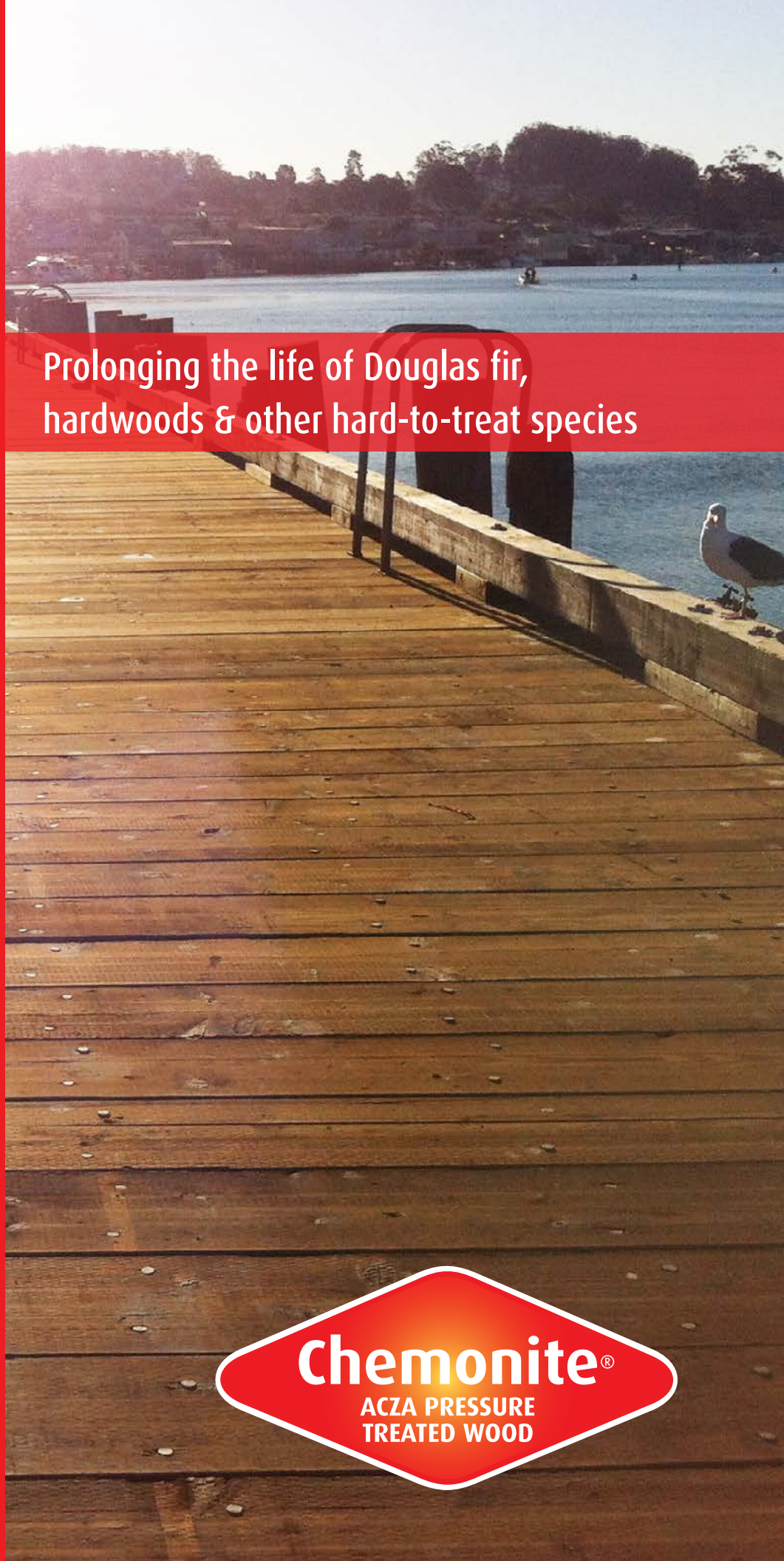
Preservative Protection

Prolonging the life of Douglas fir, hardwoods & other hard-to-treat species



Chemonite®
ACZA PRESSURE TREATED WOOD

Lonza Wood Protection is truly a global business, with locations around the world where we collaborate on product and technology platforms and share broad industry knowledge with regional market-focused technical, sales, marketing and regulatory expertise.

Lonza's sales and service model features offerings tailored to your needs. These include but are not limited to engineering, planning, regulatory, and marketing. In addition, we operate our own fleet of trucks to ensure on-time delivery of our quality products.

WE ENVISION A WORLD BUILT WITH WOOD™

At Lonza, we support a better quality of life for our communities by delivering technologies that enhance the performance and increase the longevity of wood, the world's greatest renewable resource™.

Through strategic acquisitions and in-house formulation expertise, Lonza has developed a comprehensive portfolio of innovations in treatments designed for products such as freshly sawn lumber, windows and doors, siding, fascia, and engineered wood products.

Lonza also continues to be a trusted supplier in the field of wood protection, making wood resistant to mold and moisture, termites, fungi, smoke development and flamespread while enhancing its beauty. We support our customers with an industry leading level of service designed to boost their success.

Lonza

Strong History Promising Future

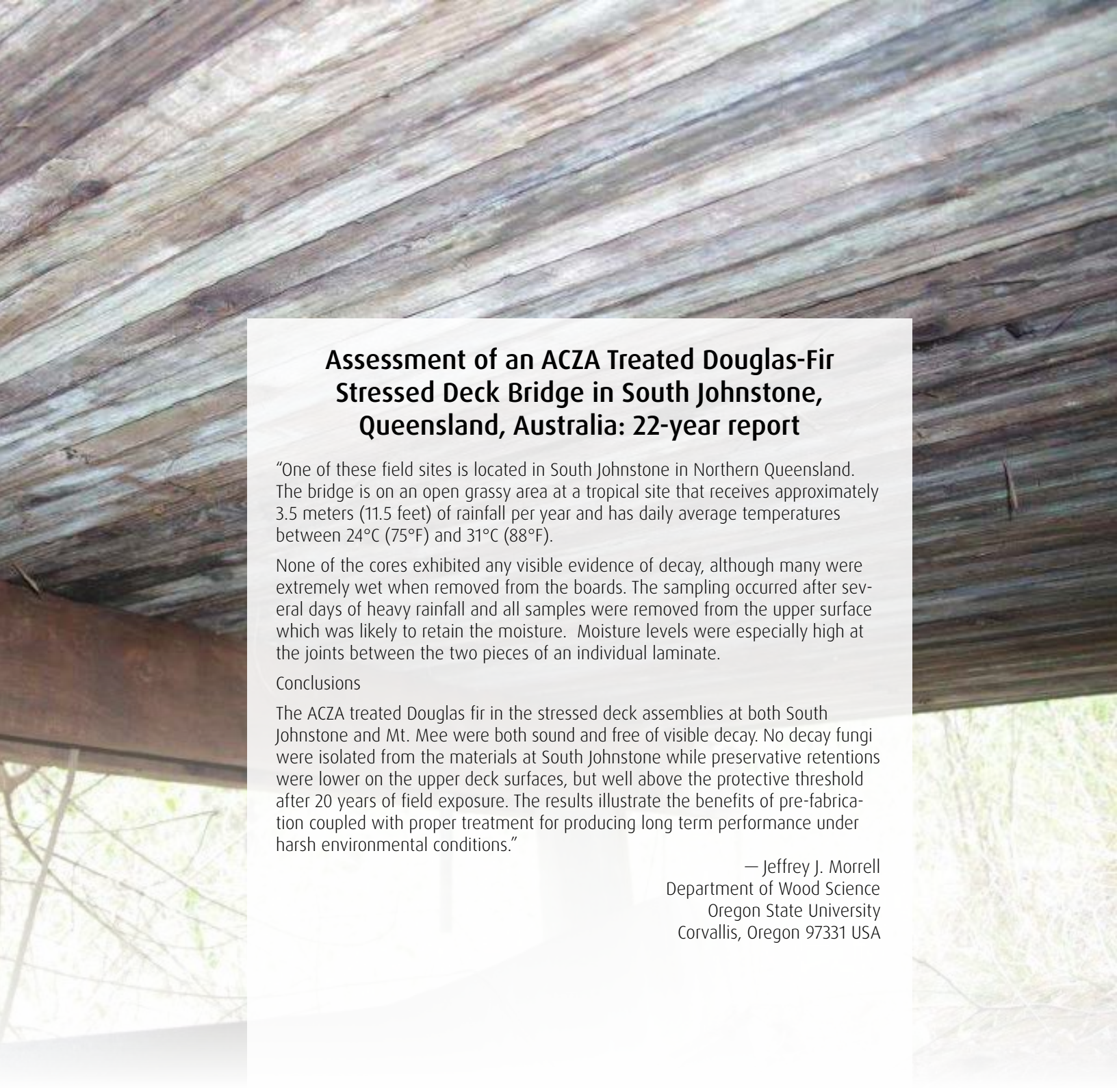
Chemonite® is the registered trade name for Ammoniacal Copper Zinc Arsenate (ACZA) and its predecessor, Ammoniacal Copper Arsenate (ACA), which have been used for treatment since 1935. Most commercial treatments are of other difficult-to-treat species for a wide variety of above ground, ground contact, freshwater and saltwater applications.

Introduced in 1985, ACZA represented an improvement to the earlier formulation with respect to efficacy, leaching and appearance. Thirty years of commercial production, long term field tests and laboratory fungal and termite tests have demonstrated the efficacy and performance of ACZA treated wood.

Recent approval by AWPA for use in railroad crossties has resulted in considerable new testing and initiation of new field studies to monitor long term performance of Chemonite® treated wood. Solution corrosion, wood corrosion, conductivity, spike holding and strength properties are shown to be comparable with wood treated with other preservatives. Fire retardant properties are improved by use of ACZA.

A Life Cycle Assessment (LCA) confirmed that ACZA-treated wood uses less energy and resources, has a lower environmental impact, decreases greenhouse gas levels, and offsets fossil fuel use, when compared to concrete, steel and fiber-reinforced composites. For more information see the reports at www.Chemonite.com.

The performance of ACZA treated wood can be enhanced by the addition of borates to provide protection beyond the depth of the ACZA penetration. Secondary treatments such as ET® Brown can be used to improve the surface properties and climbability of ACZA utility poles.



Assessment of an ACZA Treated Douglas-Fir Stressed Deck Bridge in South Johnstone, Queensland, Australia: 22-year report

"One of these field sites is located in South Johnstone in Northern Queensland. The bridge is on an open grassy area at a tropical site that receives approximately 3.5 meters (11.5 feet) of rainfall per year and has daily average temperatures between 24°C (75°F) and 31°C (88°F).

None of the cores exhibited any visible evidence of decay, although many were extremely wet when removed from the boards. The sampling occurred after several days of heavy rainfall and all samples were removed from the upper surface which was likely to retain the moisture. Moisture levels were especially high at the joints between the two pieces of an individual laminate.

Conclusions

The ACZA treated Douglas fir in the stressed deck assemblies at both South Johnstone and Mt. Mee were both sound and free of visible decay. No decay fungi were isolated from the materials at South Johnstone while preservative retentions were lower on the upper deck surfaces, but well above the protective threshold after 20 years of field exposure. The results illustrate the benefits of pre-fabrication coupled with proper treatment for producing long term performance under harsh environmental conditions."

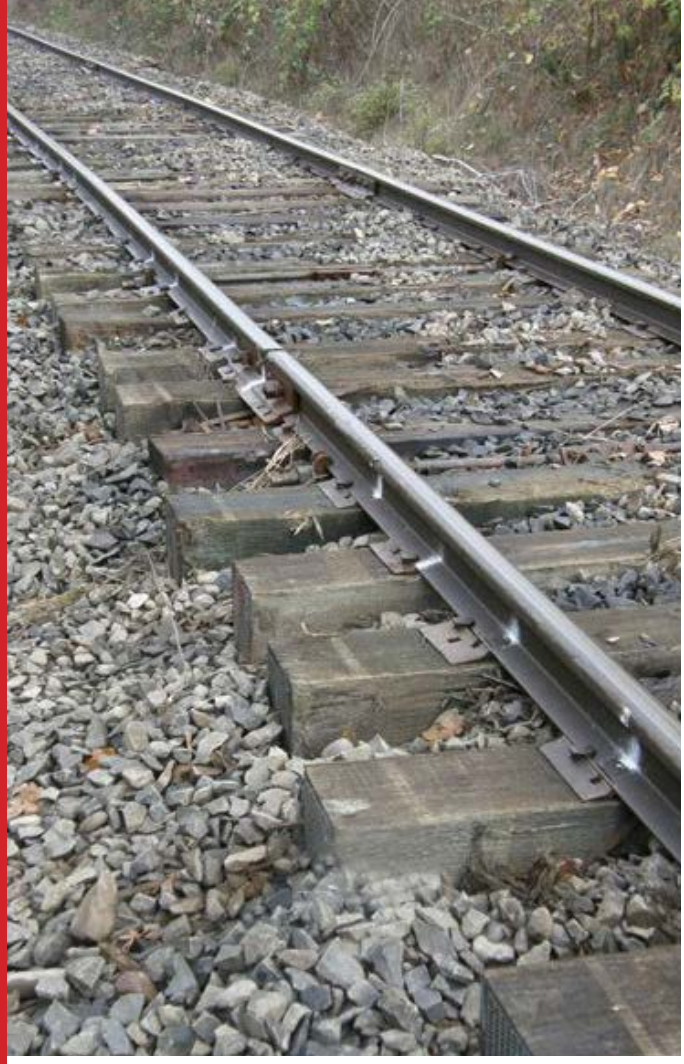
— Jeffrey J. Morrell
Department of Wood Science
Oregon State University
Corvallis, Oregon 97331 USA

Applications

Chemonite® treated wood is especially appropriate for industrial, utility, marine, agricultural and heavy construction applications, where coastal Douglas fir or difficult-to-treat refractory species are used, or where longevity is a concern.

Typical applications include:

- Utility poles — distribution & transmission
- Railroad crossties
- Building poles
- Foundation piling
- Land and freshwater piling
- Marine piling and structures
- Structural timbers or supporting columns used for bridges, barns, homes, or other uses
- Agricultural and fence posts
- Post frame construction
- Highway construction
- Permanent wood foundations
- Laminated structures



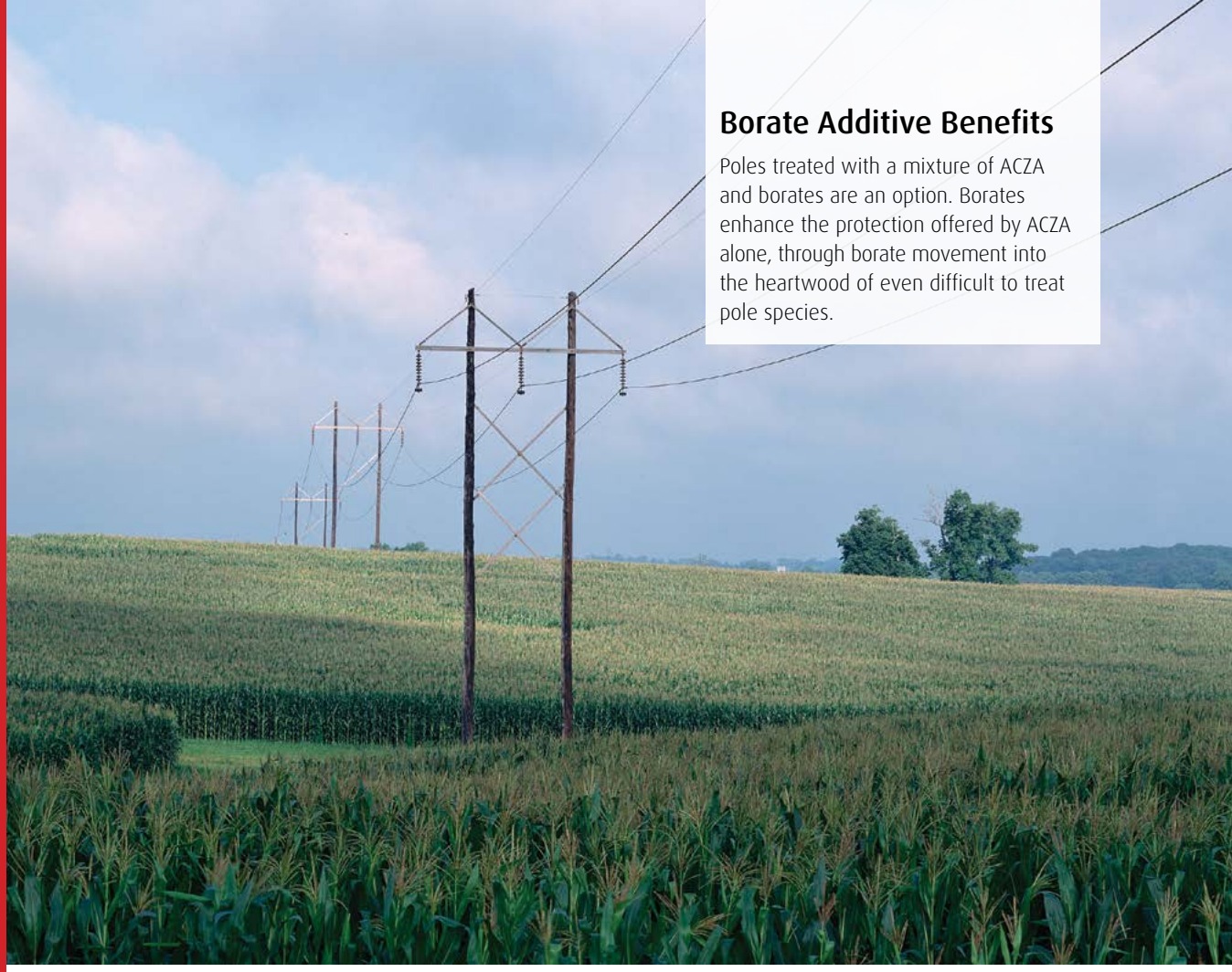
Benefits ACZA Preservative

- Protects against fungal decay and insect attack, even Formosan termite.
- Effectively penetrates most species of wood.
- Long history of successful use.
- Studies indicate resistance to carpenter ants, woodpecker damage, and fire.
- Provides protection at all levels of exposure — above ground, ground contact, freshwater and saltwater.
- May be stored and worked with like untreated wood.
- Recognized by model building codes.
- Leach-resistant.
- Can be painted or stained.
- Borates can be included into the treating solution to increase the protection of wood products.
- ET® Brown post treatment can be used to improve surface characteristics such as climbability.
- Life Cycle Assessments (LCA) confirm environmental attributes.
- Backed by limited warranties for utility poles, railroad crossties and SYP timbers.
- At the time of shipment from the treating plant, Chemonite® preserved plywood is sufficiently dry for painting. If timbers are to be painted and there is insufficient time for air-seasoning, specify kiln drying after treatment to 19% for lumber products.

LCA

Life Cycle Assessments confirm that ACZA treated wood uses less energy and resources, has a lower environmental impact, decreases greenhouse gas levels, and offsets fossil fuel use, when compared to concrete, steel and fiber-reinforced composite.

For more information see the report at www.Chemonite.com.



Borate Additive Benefits

Poles treated with a mixture of ACZA and borates are an option. Borates enhance the protection offered by ACZA alone, through borate movement into the heartwood of even difficult to treat pole species.

The Chemonite® Pole

Chemonite® poles provide reliable transmission and distribution of electric energy, with practical benefits and less environmental impact than alternatives such as concrete and steel. The ACZA treatment consistently meets recognized standards of penetration and retention in difficult-to-treat species such as Douglas fir. Poles ranging from 25′ to 135′ are readily available.

Poles have been known to provide uninterrupted service for more than 40 years. The USDA Forest Products Laboratory states that the expected life of Chemonite® poles is 50 years.

Corrosion. No Chemonite® poles are known to have been removed from service due to failure from corrosion. In fact, bolts removed from utility poles after 40 years of service have exhibited accepted strength properties.

Fire. Tests indicate that Chemonite® wood provides fire retardant properties. These tests confirm utility field crew reports that Chemonite® wood resists grass and brush fires.

Electric Conductivity. Conductivity is related to moisture content, not treatment method. Chemonite® poles have no higher conductivity factor than other treated or untreated poles.

Climbability. Research has indicated that the force required to penetrate Chemonite® poles by a line worker's gaff is comparable to that of untreated Douglas fir.

Steam Sterilization. The treatment system allows for the use of steam sterilization during the treatment process to kill existing fungal infection in the heartwood.

Reuse and Disposal. Many utilities reinstall poles removed from service at other locations. It is also very common for poles to be reused for other purposes. Disposal requirements are typically the same as for other large construction products; check with local landfills for details.

Warranty. Chemonite® ACZA treated utility poles are backed by a 50-year limited warranty. To view the warranty, see www.Chemonite.com.

Borate Additive Benefits

Crossties, treated with a mixture of ACZA and borates, are an option. Like ACZA, borates have a long history of effective decay prevention. They have been used for decades to protect sill plate, and have supplemented other preservatives in protecting hard-to-treat species of wood. The borates diffuse deep into these species, as confirmed by tests on hardwoods at Mississippi State University. The result is protection of inner areas that might otherwise be vulnerable to decay when exposed by cracks or wear. Borates also inhibit corrosion, enabling spikes to maintain their integrity for a longer period of time and thus hold gage longer.

The Chemonite® Tie

Ammoniacal Copper Zinc Arsenate (ACZA) is made for heavy duty applications. The long-term protection of ACZA preservative yields a construction material that has been providing reliable service for decades – in utility poles, building poles, foundation piling, bridge girders, guardrail posts, roller coasters, marine piling, glue laminated members, cooling tower stock, and other demanding applications.

Long-term protection, plus advantageous economical and handling features make ACZA-treated crossties an exceptional choice for railroads.

Chemonite® ACZA-treated crossties have the characteristics of all Chemonite® ACZA-treated wood and more.

- It is resistant to termites and fungal decay.
- Tie strength is not perceptibly affected by treatment.
- In all testing to date, ACZA treatments have shown no more metal corrosion than from untreated wood. In typical rail tie installations the use of special hardware is not required. However, the end use including the design, exposure conditions, etc., should be evaluated to determine if hot dipped galvanized or stainless steel hardware should be recommended.
- ACZA crossties have excellent spike-holding characteristics.
- Tests have indicated that the metallic oxides in ACZA are no more conductive than untreated wood. Regardless of the test method used, a bigger factor than wood species or preservative is moisture, which affects all types of treated wood crossties.
- Crossties can be coated with silicone sealer (AntiBlu® H_20 Water Block) or treated with clear or brown ET® oil emulsion.

Warranty. Chemonite® ACZA treated crossties are backed by a 25-year limited warranty. To view the warranty, see www.Chemonite.com.

The Chemonite® Pile

Salt and fresh water, in immersion or splash and spray exposure, are tough on building materials: steel corrodes, concrete erodes and fractures, and wood is subject to borer attack and decay. But the right wood, pressure treated to the proper treatment and retention, resists these factors.

Chemonite® preserved wood piling and structural members have been used for many years in waterfront facilities due to the ability to withstand the rapid decay and deterioration found in marine environments.

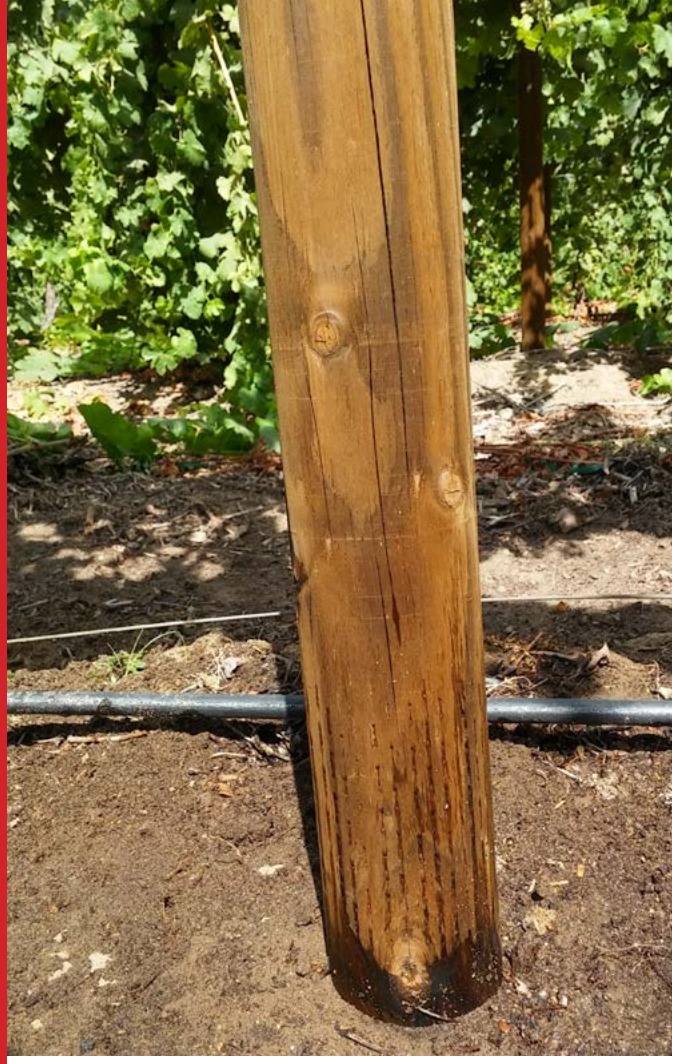
Chemonite® wood is ideal for marine structures, in, out of, or near water. Chemonite® wood will last for decades, resisting severe weather conditions and the attack of marine borers. Chemonite® wood is leach resistant and does not affect the structural qualities of the wood.

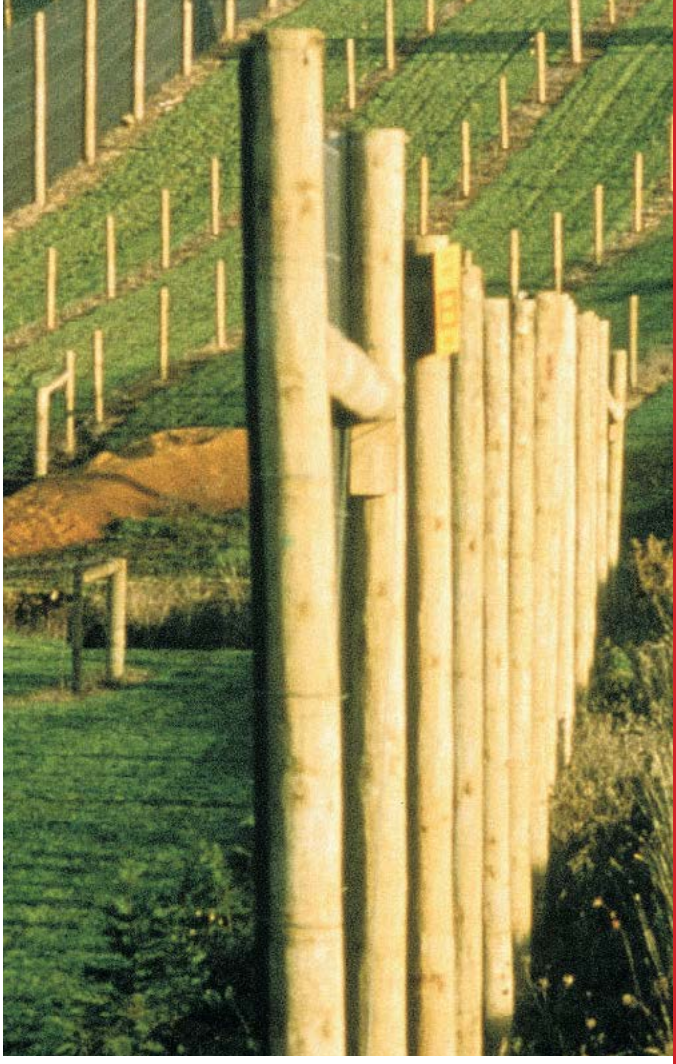
Chemonite® preservative protects timbers and piling from decay, allowing the use of wood for piling structures, boardwalks, docks, launching ramps and service buildings in marine construction.

Best Management Practices (BMPs)

The Western Wood Preservers Institute (WWPI), in conjunction with industry representatives, users, and scientists, developed BMPs to help reduce leaching of preservative chemicals in treated wood prior to shipment. In the fixation process of ACZA, some preservative components bond to the wood while others form insoluble precipitates. Specification of BMPs results in wood with a very low percentage of leached preservative, and may also reduce shipping weight.

BMPs have been established for Chemonite® treated wood. Details are available on the WWPI website (www.wwpinstitute.org) or by contacting a supplier.





The Chemonite® Post

Chemonite® preserved wood has been used for many years for agricultural applications where its long-lasting qualities have helped increase profits by reducing maintenance, upkeep and replacement costs. Chemonite® poles or sawn timbers embedded in the ground act as the foundation and main structural supports for houses, barns, sheds, and auxiliary structures.

Chemonite® preservative is proven to protect wood from decay and termite hazards, enabling you to utilize wood in contact with the ground or water for agricultural posts and end posts, fence posts, drop poles, tree props, splash boards, culverts, retaining walls and other ground or water uses.

Chemonite® preserved wood will not adversely affect crops or stock and may be painted or left in its natural green-brown color.

Warranty. Chemonite® ACZA treated agricultural posts are backed by a 20-year limited warranty. To view the warranty, see www.Chemonite.com.

Douglas Fir, Other Species

ACZA treatment can effectively protect many species, including Douglas fir, southern pine, radiata pine, red pine, eastern white pine, ponderosa pine, jack pine, spruce, western red cedar, northern white cedar, lodgepole pine and hardwoods.

For its dimensional stability, high strength-to-weight ratio, nail-holding capability, and other properties, Douglas fir is prized as a structural lumber. It is not easily treated, but the ammonia and heat used in the ACZA treating process enable Chemonite® preservative to provide effective protection of the wood.

Douglas fir is not a true fir, but comprises several species in their own genus, Pseudotsuga. There are differences among these species and even within them. For some applications, AWPA standards distinguish between coastal Douglas fir (grown between the Pacific Ocean and the summit of the Cascade Mountains) and interior Douglas fir.

Use & Handling

Construction: Bracing with round timber piles rather than sawn timbers is recommended for marine construction below high tide. All untreated wood exposed by cutting or drilling should be adequately field-treated. Avoid removing the outer shell of wood where treatment is heaviest and decay-resistance greatest. It is recommended that all structures be prefabricated before treatment; minimize problems by specifying framing, dapping and drilling before treatment whenever possible.

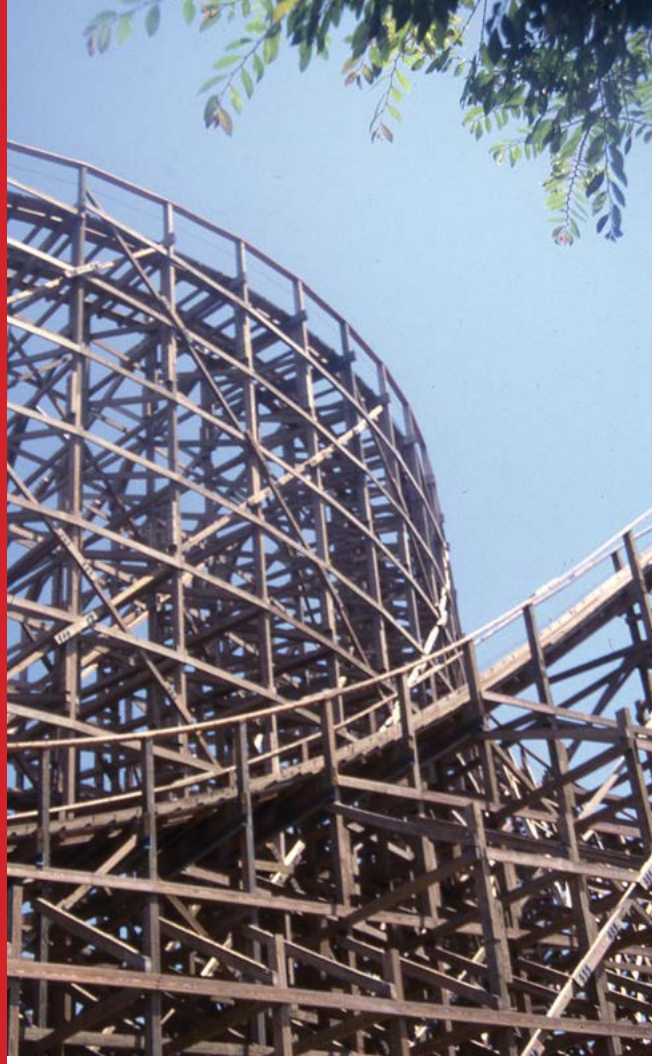
Worker Safety: Chemonite® wood can be stored and worked with like untreated wood. As with any wood, wear gloves to avoid splinters, wear eye protection and a dust mask when sawing, drilling and sanding. Wash hands after handling and before eating or smoking. Dispose of cut ends in a proper landfill. Treated wood should not be burned in open fires or in stoves, fireplaces or residential boilers. Treated wood may be burned only in commercial or industrial incinerators or boilers in accordance with state and federal regulations.

Standards & Codes

ACZA is listed in the American Wood Protection Association (AWPA) Standard P22 for Waterborne Preservatives. Wood treated with this preservative is accepted in AWPA Standard U1 for applications in Use Categories 1 through 5, that is, from interior applications to salt water immersion. Within the requirements of the standards, ACZA can be used to treat numerous species of wood; however, its ability to penetrate makes it particularly useful in the treatment of hardwoods and coastal Douglas fir, for which it is most commonly used.

AWPA standards are referenced in government specifications and model building codes for treated wood products.

Chemonite® wood is also listed in standards of the Canadian Standards Association (CSA 080).



Incising

In difficult-to-treat woods such as hardwoods and western species, penetration improvement methods are employed to improve the depth and uniformity of preservative penetration into wood. Most commonly this is seen as a pattern of slits ("incisions") on the surface of the wood. Full-length incising and deep incising are typically used for poles and piling. Radial drilling and through boring are additional methods used for poles.

Although these methods can improve protection, they can result in a strength reduction for the wood, depending on the pattern, size, and number of incisions. When treated sawn wood products have been incised, the reference design values must be multiplied by the incising factor, C_i, in accordance with section 4.3.8 of the National Design Specification for Wood Construction. A review of penetration improvement methods is recommended before insertion into a specification.

Recommended Hardware

Hot-dipped galvanized fasteners and connectors are recommended for use with Chemonite® ACZA-treated wood.

- Some hardware manufacturers recommend only stainless steel connectors. We recommend no less than post Hot-Dipped Galvanized, HDG, fasteners (meeting ASTM A 153) and connectors (ASTM A 653 Class G185 sheet), where there is contact with ACZA-treated wood. In all cases, be sure to observe building code requirements.
- In highly corrosive environments — such as exposure to salt air, industrial fumes, fertilizer storage, high humidity, and constant wetting — appropriate stainless steel should be used. For below-grade permanent wood foundations, building codes generally require stainless steel.
- Always use fasteners and connectors made of the same type of material; dissimilar metals can accelerate corrosion. Aluminum or electroplated galvanized metals should never be used. These metals are not accepted by the building codes for use in exterior applications.

ACZA Treated Wood Specification Guide for Commercial, Industrial, and Aquatic Use

		AWPA U1 Standard			Canada CSA 080	
		Use Category Designation	Commodity Spec	Preservative Retention (Lbs. per cu. ft.)	Use Category Designation	Kg/m³
AGRICULTURE, FARM	**Structural Members**					
	Round posts (<16')	4B	B	0.60	4.2	9.6
	Round poles	4B	D	0.60[1]	4.2	9.6
	Sawn poles and posts	4B	A	0.60	4.2	8.0
	Posts, Fence (<16')					
	Round, half & quarter round	4A	B	0.40	4.1	6.4
	Sawn four sides	4A	A	0.40	4.1	6.4
CROSSTIES	Listed pines, Doug fir, hardwoods	4A	C	0.40	4.1, 4.2	6.4
BUILDING CONSTRUCTION, MARINE AND FRESHWATER	**Lumber & Timbers**					
	Floor plate	2	A	0.25	3.2	4.0
	Ground contact and fresh water use	4A	A	0.40	4.1	6.4
	Sawn timbers supporting resdtl & coml structures	4B, 4C	A (4.8)	0.80	4.2	8.0
	Salt water splash	4B, 4C	A	0.60	4.1	6.4
	Subject to tides, waves or in salt water — severe[2]	5B, 5C	G	2.50	NA	NA
	Subject to tides, waves or in salt water — northern[3]	5A	G	1.90	5A	30.0
	Permanent Wood Foundation					
	Lumber & plywood (KDAT required)	4B	A (4.2)	0.60	4.2	8.0
	Plywood					
	Sub-floor, damp above ground	2	F	0.25	2	4.0
	Exterior, above ground	3B	F	0.25	3.2	4.0
	Ground contact and fresh water use	4A	F	0.40	4.1	6.4
	Salt water splash	4B	F	0.60	4.1	6.4
	Subject to tides, waves or in salt water	5B	G	2.50	5A	30.0
	Piling					
	Round piling, marine – severe exposure[2]	5B, 5C	G	2.50	NA	NA
	Round piling, marine – northern waters[3]	5A	G	1.50	5A	30.0
	Round piling – land & fresh water (Douglas fir)	4C	E	1.00	4.2	12.0
	Poles, Building					
	Round – structural	4B	B (4.4.1)	0.60	4.2	9.6
	Sawn – structural	4B	A	0.60	4.2	8.0
	Glue-Laminated Members, Douglas Fir (treated after gluing)					
	Above ground – interior/exterior	1, 2, 3B	F	0.30	1, 2, 3.2	NA
	Ground contact & fresh water use	4A, 4B, 4C	F	0.60	4.1, 4.2	NA
POLES, UTILITY		4A, 4B, 4C	D	0.60[1]	4.1, 4.2	9.6
HIGHWAY MATE RIAL	**Lumber & Timbers**					
	Lumber and timbers for bridges, structural members, decking, cribbing, & culverts	4C	A (4.3.1)	0.60	4.2	8.0
	Structural Posts & Timbers					
	Round, half round, quarter round[5]	4B	B	0.50	4.2	9.6
	Sawn	4C	A	0.60	4.2	8.0
	Posts, Guardrail					
	Round	4B	B	0.50	4.2	9.6
	Sawn	4B	A	0.60	4.2	8.0

[1]An Inner Zone requirement (0.30 pcf) exists for Douglas fir.

[2]In 5B and 5C applications where *Sphaeroma terebrans*, *Limnoria tripunctata*, and *Toredo* or *pholads* are present, dual treatment is recommended: for solid sawn wood — 1.50 pcf ACZA followed by 20 pcf creosote, and for round piling — 1.00 pcf ACZA followed by 20 pcf creosote.

[3]Northern waters defined as Long Island (NY) and northward on the East Coast and north of San Francisco on the West Coast.

[5]Doug fir and other western species not recommended for half-round and quarter-round posts.

NA = Not in Standard. Cannot use.

For sensitive environments, specify material treated in compliance with Best Management Practices.

This table is meant as a guide. See the most recent AWPA standard for details prior to specification.

Chemonite®
ACZA PRESSURE
TREATED WOOD

FAQs

Frequently Asked Questions

1. What is Chemonite® wood?
Chemonite® is the registered trade name for wood protected by ACZA (ammoniacal copper zinc arsenate), a waterborne wood preservative. Pressure treating wood with ACZA protects it against marine borers, insect attack, and decay. First developed at the University of California in the 1920s, the preservative was commercially developed for the treatment of coastal Douglas fir and other hard-to-treat species in the 1940s.

2. How is wood treated with ACZA?
First, tiny cuts called incisions are made in the wood. The wood is loaded on carts and pushed into a large steel cylinder. The cylinder is closed, vacuum is used to remove excess air and moisture from the wood cells, and warm ACZA solution is pumped in. Pressure and heat are applied to force the solution deep into the wood cells.

3. Will the chemicals wash out in water or in the ground?
Chemonite® wood is leach resistant. The U.S. Environmental Protection Agency (EPA) has stated that "Arsenicals in treated wood have a very low tendency to leach into the soil..."

4. Does ACZA treatment change the color of the wood?
Chemonite® treated wood has a dark greenish brown color from the copper compounds in the preservative. But the color is difficult to control. Sapwood will tend to be greenish brown with heartwood tending toward more brownish black. Over time, as the wood weathers, the color becomes more uniform.

5. Does Chemonite® wood have an odor?
Only when freshly treated. Once the ammonia evaporates, the treated wood is nearly odorless. (Avoid storing any freshly treated wood in damp, unventilated facilities.)

6. How do I treat end cuts?
Minimize any cutting to obtain the maximum benefit of the treatment by not exposing untreated wood to decay hazards. If you do cut Chemonite® treated wood, the exposed areas should be a product such as QNAP®2, Copper Naphthenate RTU. This 2% oil-borne preservative, which meets American Wood Protection Association (AWPA) M-4 End Cut and Field Cut requirements, can be used in the field as a brush-on application for end cuts, dap cuts, drill holes, and other applications. Orient supporting posts so that original factory treated ends are in ground contact. Trim the top ends as needed and cover them with post caps or cut them at angles to shed water and treat with a brush-on preservative Use a generous amount to completely saturate any untreated areas of your project exposed by cutting or drilling.

7. Does Chemonite® wood present a safety hazard?
Wood treated with ACZA falls under the U.S. Environmental Protection Agency's (EPA) minimum protective precautions. Other than the normal safety measures suggested for handling any wood (wear gloves when handling, goggles and a dust mask when drilling or sawing), no special handling or clothing is required. See the Consumer Safety Sheet at www.Chemonite.com.

8. Does ACZA treatment affect the strength of the wood?
The National Design Specification allows the same strength values for treated as for untreated lumber of the same species, grade, and moisture content. However, when incised, the incising factor should be applied.

9. Do nails hold well in Chemonite® wood?
Laboratory tests and field experience indicate that nails hold just as well or better in Chemonite®-treated lumber as they do in untreated lumber. For fasteners and connectors, always use hot-dipped galvanized, stainless steel or an approved equal.

10. Can Chemonite® wood be painted? If so, how soon after treatment?
Yes. Simply follow the manufacturer's instructions. The wood should be clean and dried to 19% moisture content or less before paint is applied.

11. How long will this treated wood last?
Thirty to fifty years or longer in many end uses when treated to AWPA standards and barring any incidental damage.

12. Does the treatment affect the flamespread rating of wood?
Chemonite® wood is slightly more difficult to ignite than untreated lumber. Tests conducted at Underwriters Laboratories Inc. confirm the fire resistant qualities of Chemonite® wood:

- Douglas fir lumber treated with 0.35 pcf of ACZA had a 41.7 flame spread rating, which displays the properties of a Class B rating.
- Douglas fir lumber treated with 1.86 pcf of ACZA had a 24.8 flame spread rating, which displays the properties of a Class A rating.

13. Will Chemonite® wood last if it's buried in the ground?
Yes. Wood treated to the minimum 0.40 pcf retention is expected to withstand wood-destroying organisms in ground contact.

14. Is Chemonite® wood suitable for aquatic applications?
Yes. Treatment in accordance with AWPA standards provides a long service life. Wood that conforms with the Best Management Practices (BMPs) of the Western Wood Preservers Institute is suitable for use in aquatic environments.

15. Does Chemonite® wood have a warranty?
Yes. Chemonite® utility poles and railroad crossties are backed by a limited warranty. See www.Chemonite.com.

Specification

A model spec is available on our website. It is in an editable format for convenient customization.

www.Chemonite.com

CH-0092-R6